

Andreas Stathopoulos

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RESEARCH INTERESTS

High Performance Scientific Computing:

- *Iterative methods in numerical linear algebra*: eigenvalue methods and preconditioning, restarting techniques, sequences of linear systems, Jacobi-Davidson methods, Markov chains
- *Parallel and distributed computing*: scalable implementations of scientific codes, resource balancing in heterogeneous/shared environments, computational Grids
- *Computational sciences and applications*: electronic structure applications, materials science, order N methods for *ab-initio* calculations, lattice gauge QCD, statistical learning and data mining

EDUCATION

- Ph.D.** Computer Science Department, Vanderbilt University, Nashville, TN
May 1995 Dissertation Title: *Preconditioned Iterative Methods for the Large, Sparse, Symmetric, Eigenvalue Problem on Multicomputers*
- M.Sc.** Computer Science Department, Vanderbilt University, Nashville, TN
Dec. 1991 Thesis Title: *Scientific and Statistical Multidatabases*
- B.Sc.** Department of Mathematics, University of Athens, Athens, Greece
July 1989 Emphasis: Numerical Analysis, Probability, and Statistics

EXPERIENCE

- 2002 – *Associate Professor*
Computer Science Department, College of William and Mary, Williamsburg, VA
- 1997–02 *Assistant Professor*
Computer Science Department, College of William and Mary, Williamsburg, VA
- 1995–97 *NSF Postdoctoral Research Associate*
Computer Science Department, University of Minnesota, Minneapolis, MN
Conducted research on eigenvalue preconditioning for solving interdisciplinary problems on high performance computers in collaboration with Dr. Yousef Saad
- 1993 *Summer Visiting Researcher*
Army High Performance Computing Research Center, Minneapolis, MN
- 1990–94 *Research Assistant / Teaching Assistant*
Computer Science Department, Vanderbilt University, Advisor: Dr. C. F. Fischer

GRANTS/AWARDS

- 2007-10 NSF Theoretical Foundations (CCF 0728915), \$200,000, PI
“Numerical Linear Algebra Problems and Quantum Chromodynamics”
Responsible: 75%, Co-PI: Prof. Orginos
- 2008-10 DOE Jefferson Lab matching grant to NSF CCF 0728915, \$69,716,
Supplementary support for a postdoctoral associate
- 2007-10 NSF Computer Systems Research (CNS 0720699), \$200,000, Co-PI
“Autocorrelated Flows in Systems: Analytic Models and Applications”
Responsible: 10%, PI: Prof. Smirni
- 2007-12 NSF CSUMS (DMS 0703532), \$848,882, Co-PI
Computational Science Training for Undergraduates in the Mathematical Sciences
“Theory, techniques, and research in computational mathematics”
Responsible: 6%, with Profs. Li, Day, Lewis, Lutzer, Phillips, Shi, Smith and Torczon
- 2003-08 NSF Information Technology Research (ITR/DMR 0325218), \$4M, SP
“Institute for the Theory of Advanced Materials in Information Technology”
Responsible: \$37,669, PI: J. R. Chelikowsky with 11 SPs
- 2001-04 NSF Information Technology Research (ITR/AP-0112727), \$269,364, PI
“High performance iterative methods on parallel computers and
distributed, shared environments”
- 2001-02 NSF Experimental and Integrative Activities (EIA-9712718), \$157,880, PI
“Undergraduate Modeling and Simulation Research Seminar”
Responsible 40%, Co-PIs: Profs. L. Leemis and S. Zhang
- 2000-04 DOE Computational Science fellowship, academic advisor for R. Mills, \$82,613
- 2000-03 NSF Information Technology Research (ITR/ACS-0082094), \$ 441,981, Co-PI
“New algorithms for scalable modeling in materials science”
Responsible: 32%, with Profs. Saad and Chelikowsky
- 2000-02 Virginia Space Grant Consortium, graduate research fellowship for J. McCombs
- 1999-02 NSF Major Research Instrumentation (EIA-9977030), \$461,820, Co-PI
“Acquisition of High Performance Clusters for Effective Parallel Computing in
Computational Science Research and Education”
Responsible: 15%, Co-PIs: Profs. Krakauer, Smirni, Torczon, Voigt, S. Zhang, X. Zhang
- 1999 College of William and Mary, May research seminar grant
with Math Profs. Rodman, Spitkovsky, Woerdeman
- 1998-99 NATO collaborative research grant, \$5000, PI, Co-PI: Prof. Ynnerman
“Parallel Implementation of Particle-In-Cell Simulations of Astrophysical Plasmas”
- 1998-99 Summer research award \$5000/year, College of William and Mary
- 1998 Teaching and curriculum development grant, College of William and Mary
- 1995-97 NSF CISE Postdoctoral Research Associateship
“Parallel iterative methods and preconditioners for the large, sparse,
symmetric eigenvalue problem”
- 1994 Dissertation Enhancement Award \$2,000, Vanderbilt University
- 1993 Travel Grant from AHPARC and University of Minnesota
- 1991-95 Teaching and research assistant, Vanderbilt University

JOURNAL PUBLICATIONS

1. A. Stathopoulos and J. R. McCombs, “Nearly optimal preconditioned methods for Hermitian eigenproblems under limited memory. Part II: Seeking many eigenvalues”, *SIAM Journal on Scientific Computing*, Vol. 29, No. 5, (2007), 2162-2188.
2. A. Stathopoulos, “Nearly optimal preconditioned methods for Hermitian eigenproblems under limited memory. Part I: Seeking one eigenvalue”, *SIAM Journal on Scientific Computing*, Vol. 29, No. 2, (2007), 481–514.
3. R. T. Mills, C. Yue, A. Stathopoulos and D. S. Nikolopoulos, “Runtime and Programming Support for Memory Adaptation in Scientific Applications via Local Disk and Remote Memory”, *Journal of Grid Computing*, (2007), 10.1007/s10723-007-9075-7.
4. J. R. McCombs and A. Stathopoulos, “Iterative Validation of Eigensolvers: A Scheme for Improving the Reliability of Hermitian Eigenvalue Solvers”, *SIAM Journal on Scientific Computing*, Vol. 28, No. 6, (2006), 2337–2358.
5. A. Stathopoulos, “Using the PRIMME eigensolver in materials science applications”, *Physica Status Solidi B-Basic Research*, Vol. 243, No. 9, (2006), 1–11.
6. A. Stathopoulos, A. Riska, Z. Hua, E. Smirni, “Bridging ETAQA and Ramaswami’s Formula for the Solution of M/G/1-type Processes”, *Performance Evaluation*, Vol. 62, (1–4), October 2005, 331–348.
7. M. E. Dieckmann, B. Eliasson, A. Stathopoulos and A. Ynnerman, “Connecting Shock Velocities to Electron-Injection Mechanisms”, *Physical Review Letters*, 92, (6), (2004), 65006-1–4.
8. J. R. McCombs and A. Stathopoulos, “Parallel, multigrain iterative solvers for hiding network latencies on MPP’s and networks of clusters”, *Parallel Computing*, Vol. 29, Issue. 9, (2003), 1237–1259.
9. A. Stathopoulos, “A case for a biorthogonal Jacobi-Davidson method: restarting and correction equation”, *SIAM Journal on Matrix Analysis and Applications*, Volume 24, Number 1, (2002), 238–259.
10. A. Stathopoulos and K. Wu, “A block orthogonalization procedure with constant synchronization requirements”, *SIAM Journal on Scientific Computing*, Volume 23, Number 6, (2002), 2165–2182.
11. A. Stathopoulos and S.-H. Teng, “Recovering mesh geometry from a stiffness matrix”, *Numerical Algorithms* Vol. 30, Nos. 3/4, (2002), 303–322.
12. A. Stathopoulos, S. Ögüt, Y. Saad, J.R. Chelikowsky, and H. Kim, “Parallel methods and tools for predicting material properties,” *Computing in Science and Engineering* Vol. 2, No. 4, (2000), 19–32. (former IEEE Computational Science & Engineering).
13. J.R. Chelikowsky, Y. Saad, S. Ögüt, Igor Vasiliev and A. Stathopoulos, “Electronic Structure Methods for Predicting the Properties of Materials: Grids in Space”, *Physica Status Solidi B-Basic Research*, Vol. 217, No. 1, (2000), 173–195, T. Frauenheim and M. Pederson (eds.), Publisher: Wiley-VCH, Germany.
14. A. Stathopoulos and Y. Saad, “Restarting techniques for the (Jacobi-)Davidson symmetric eigenvalue methods,” special issue on Eigenvalue Methods, *Electronic Transactions on Numerical Analysis*, Vol. 7 (1998) 163–181.

15. K. Wu, Y. Saad and A. Stathopoulos, "Inexact Newton Preconditioning Techniques for Eigenvalue Problems," special issue on Eigenvalue Methods, *Electronic Transactions on Numerical Analysis*, Vol. 7 (1998) 202–214.
16. A. Stathopoulos, Y. Saad, and K. Wu, "Dynamic Thick Restarting of the Davidson, and the Implicitly Restarted Arnoldi Methods," *SIAM Journal on Scientific Computing* 19, 1, (1998) 227–45.
17. Y. Saad, A. Stathopoulos, J. R. Chelikowsky, K. Wu and S. Ogut, "Solution of Large Eigenvalue Problems in Electronic Structure Calculations," *BIT*, 36:3 (1996) 563–578.
18. A. Stathopoulos, A. Ynnerman, and C. F. Fischer, "A PVM Implementation of the MCHF Atomic Structure Package," *International Journal of Supercomputer Applications and High Performance Computing*, Vol. 10, No. 1, (1996) 41–61.
19. A. Stathopoulos, Y. Saad, and C. F. Fischer, "Robust Preconditioning of Large, Sparse, Symmetric Eigenvalue Problems," *the Journal of Computational and Applied Mathematics*, 64 (1995) 197–215.
20. A. Stathopoulos and C. F. Fischer, "A Davidson Program for Finding a Few Selected Extreme Eigenpairs of a Large, Sparse, Real, Symmetric Matrix," *Computer Physics Communications* 79 (1994) 268–290.

REFEREED CONFERENCE PUBLICATIONS

21. C. Yue, R. T. Mills, A. Stathopoulos and D. S. Nikolopoulos, "Runtime support for memory adaptation in scientific applications via local disk and remote memory", in the Proceedings of the 15th IEEE International Symposium on High Performance Distributed Computing (HPDC '06), Paris, France, 2006. Acc. rate: 15%. (**One of five nominations for best paper**)
22. M. E. Dieckmann, B. Eliasson, A. Stathopoulos and A. Ynnerman, "Kinetic simulation of electron injection by electrostatic waves", *Baltic Astronomy*, 13, (2004), 284–288. Appeared also in Proceedings of Joint European and National Astronomical Meeting '03, Budapest, Hungary.
23. R. T. Mills, A. Stathopoulos and D. Nikolopoulos, "Adapting to memory pressure from within scientific applications on multiprogrammed COWs", International Parallel and Distributed Processing Symposium (IPDPS 2004), Santa Fe, USA. Acc. rate: 31.8%.
24. J.R. McCombs, R.T.Mills and A. Stathopoulos, "Dynamic load balancing of an iterative eigensolver on Grids of heterogeneous clusters", International Parallel and Distributed Processing Symposium (IPDPS 2003), Nice, France. Acc. rate: 29.2%.
25. J.R. McCombs and A. Stathopoulos, "Multigrain parallelism for eigenvalue computations on networks of clusters", Proceedings of the 11th IEEE Int. Symp. on High Performance Distributed Computing (HPDC 2002), Edinburgh, Scotland, July 23-26, (2002), 143-149. Acc. rate: 31%.
26. R. T. Mills, A. Stathopoulos, and E. Smirni, "Algorithmic modifications to the Jacobi-Davidson parallel eigensolver to dynamically balance external CPU and memory load", in Proceed. of the International Conference on Supercomputing (ICS'01), Sorrento, Italy, June 18-22, (2001), 454–463. Acc. rate: 33.8%.

27. H. Edelsbrunner, X.-Y. Li, G. Miller, A. Stathopoulos, D. Talmor, S.-H. Teng, A. Ungor and N. Walkington, "Smoothing cleans up slivers", ACM Symposium on Theory of Computing (STOC00), Portland, Oregon, May 21-23, (2000), 273–278. Acc. rate: 47%.
28. A. Stathopoulos and J. R. McCombs, "A Parallel, Block, Jacobi-Davidson Implementation for Solving Large Eigenproblems on Coarse Grain Environments", in Proceedings of the *1999 International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'99)*, Vol. VI, pp. 2920–26, (CSREA Press, 1999). Acc. rate: 24%.
29. J. R. Chelikowsky, S. Ogut, X. Jing, K. Wu, A. Stathopoulos, and Y. Saad, "Atomic and Electronic Structure of Germanium clusters at Finite Temperature using Finite Difference Methods", *Mater. Res. Soc. Symp. Proc.*, Vol. 408, (1996) pp. 19–31.
30. A. Stathopoulos and A. Ynnerman, "Dynamic Load Balancing of Atomic Structure Programs on a PVM cluster", *HPCN Europe*, Lecture Notes in Computer Science, 919 (1995) 384–391.
31. A. Stathopoulos and C. F. Fischer, "Reducing Synchronization on the Parallel Davidson Method for the Large, Sparse, Eigenvalue Problem", in: Proceed. *Supercomputing '93 (SC'93)*, pp. 172-180 (ACM Press, Portland 1993). Acc. rate: 24%.

PAPERS/CHAPTERS IN BOOKS

32. A. Stathopoulos, "Some insights on restarting symmetric eigenvalue methods with Ritz and harmonic Ritz vectors", in *Iterative Methods in Scientific Computation IV*, D. R. Kincaid & Anne C. Elster (eds.), pp. 297–311, Series in Computational and Applied Mathematics, IMACS, NJ (1999).
33. J.R. Chelikowsky, S. Ögüt, I. Vasiliev, A. Stathopoulos, and Y.Saad: "Predicting the Properties of Semiconductor Clusters," *Theory of Atomic and Molecular Clusters*, J. Jellinek, editor,(Springer-Verlag, 1999) p. 136–156.

SUBMISSIONS

1. A. Stathopoulos and K. Orginos, "Computing and deflating eigenvalues while solving multiple right hand side linear systems in Quantum Chromodynamics", Tech. Report: arXiv.org 0707.0131, July 1, 2007, submitted.
2. A. Stathopoulos, "Locking issues for finding a large number of eigenvectors of Hermitian matrices", under revision.

POSTER/ABSTRACT PUBLICATIONS

1. A. Stathopoulos, "Robust and efficient solution of Hermitian eigenproblems using PRIMME", *Fourth SIAM Conference on Computational Science and Engineering*, San Francisco, 2007.
2. A. Stathopoulos and J. R. McCombs, "PRIMME: PREconditioned Iterative MultiMethod Eigensolver. A robust, efficient and flexible Hermitian eigenvalue software", *9th GAMM-SIAM conference on Applied Linear Algebra*, Dusseldorf, Germany, 2006.
3. A. Stathopoulos and J. R. McCombs, "PRIMME: PREconditioned Iterative MultiMethod Eigensolver. A robust, efficient and flexible Hermitian eigenvalue software", *Copper Mountain conference on Iterative methods*, 2006.
4. C. Yue, A. Stathopoulos, and D. S. Nikolopoulos, "Memory adaptation of scientific applications via an application-level, remote memory library", *SIAM Conference on Parallel Processing for Scientific Computing*, 2006.

5. A. Stathopoulos, "Locking issues for finding a large number of eigenvalues of symmetric matrices", *7th IMACS Conference on Iterative Methods in Scientific Computing*, 2005.
6. A. Stathopoulos and Chao Yang, "Solving a certain type of eigenproblems with huge null spaces without matrix factorization", *Third SIAM Conference on Computational Science and Engineering*, Orlando, Florida, 2005.
7. A. Stathopoulos and J.R. McCombs, "Looking for a large number of eigenvalues of symmetric eigenproblems", *Third SIAM Conference on Computational Science and Engineering*, Orlando, Florida, 2005.
8. A. Stathopoulos and J.R. McCombs, "Iterative validation: a scheme for improving the reliability and performance of eigenvalue block iterative solvers", *Copper Mountain conference on Iterative methods*, 2004.
9. A. Stathopoulos, "How to make the (Jacobi-)Davidson method near optimal for symmetric eigenproblems", *6th IMACS Conference on Iterative Methods in Scientific Computing*, 2003.
10. A. Stathopoulos and J.R. McCombs, "Is there a symmetric eigenvalue method (software) of choice?" *8th SIAM Conference on Applied Linear Algebra*, 2003.
11. J.R. McCombs and A. Stathopoulos, "Parallel, multigrain linear system and eigenvalue solvers on MPPs and networks of clusters", *Second SIAM Conference on Computational Science and Engineering*, San Diego, California, 2003.
12. J.R. McCombs and A. Stathopoulos, "Parallel, multigrain solvers for hiding network latencies on MPP's and networks of clusters", *Workshop on Parallel Matrix Algorithms and Applications*, Neuchatel, Switzerland, 2002.
13. A. Stathopoulos, "A flexible, truncation scheme for FOM and FGMRES", *Copper Mountain conference on Iterative methods*, 2002.
14. A. Stathopoulos and J. R. McCombs, "Multigrain hybrid parallel algorithms for eigenvalue calculations", *5th IMACS Conference on Iterative Methods in Scientific Computing*, 2001.
15. A. Stathopoulos and K. Wu, "A block orthogonalization procedure with constant synchronization requirements. Part II", *7th SIAM Conference on Applied Linear Algebra*, 2000.
16. A. Stathopoulos and K. Wu, "A block orthogonalization procedure with constant synchronization requirements. Part I.", *SIAM Annual Meeting*, 2000.
17. A. Stathopoulos and J. R. McCombs, "Parallel, multigrain eigensolvers with applications to materials science", *First SIAM Conference on Computational Science and Engineering*, 2000.
18. A. Stathopoulos, "A case for a biorthogonal Jacobi-Davidson method: restarting and correction equation", *Copper Mountain Conference on Iterative methods*, 2000.
19. A. Stathopoulos and J. R. McCombs, "A Parallel, Block, Jacobi-Davidson Method for Solving Large Eigenproblems in Material Sciences", poster in *9th SIAM Conference on Parallel Processing for Scientific Computing*, 1999.
20. A. Stathopoulos, S.-H. Teng, "Recovering mesh geometry from a stiffness matrix", *Copper Mountain Conference on Iterative methods*, 1998.
21. A. Stathopoulos, B. Rackner, Y. Saad, J. R. Chelikowsky, "Performance optimization of electronic structure codes on the Cray T3E", *4th NASA National Symposium on Large-Scale Analysis and Design on High-Performance Computers and Workstations*, 1997.

22. S.-H. Teng, A. Stathopoulos, "SEAM: Spectral Embedding for Algebraic Multilevel", poster in *6th SIAM conference on Applied Linear Algebra*, 1997.
23. Y. Saad, A. Stathopoulos, K. Wu, "Formulations of preconditioning techniques for eigenvalue problems", *SIAM's 45th Anniversary Meeting*, 1997.
24. Y. Saad and A. Stathopoulos, "Preconditioning and deflation techniques for non-normal eigenvalue problems", *SIAM's 45th Anniversary Meeting*, 1997.
25. E. Chow, A. Stathopoulos, Y. Saad, "Subspace preconditioning for the Schur complement", *International Symposium on Iterative Methods in Scientific Computation*, 1997.
26. A. Stathopoulos, Y. Saad, J. R. Chelikowsky, "Parallel solution of eigenvalue problems in electronic structure calculations," in Proceed. *8th SIAM Conference on Parallel Processing for Scientific Computing*, 1997.
27. A. Stathopoulos, Y. Saad, and J. R. Chelikowsky, "Porting electronic structure calculations to the IBM-SP2," in Proceed. *International Conference on Parallel Computing*, 1996, Minneapolis, MN.
28. K. Wu, Y. Saad, and A. Stathopoulos, "Preconditioned Krylov Subspace Methods for Eigenvalue Problems," in Proceed. *Copper Mountain Conference on Iterative methods*, 1996.
29. A. Stathopoulos, Y. Saad, and K. Wu, "Thick Restarting of the Davidson Method: an extension to the Implicitly Restarted Arnoldi", in Proceed. *Copper Mountain Conference on Iterative methods*, 1996.
30. A. Stathopoulos, Y. Saad, and C. F. Fischer, "A Schur Complement Method for Eigenvalue Problems," in: Proceed. *Copper Mountain Conference on Multigrid Methods*, 1995.
31. A. Stathopoulos, A. Ynnerman, and C. F. Fischer, "PVM Implementations of Atomic Structure Programs," in: Proceed. *PVM Users' Group 1994 Meeting*, Oak Ridge, TN, 1994.
32. A. Stathopoulos, Y. Saad, and C. F. Fischer, "Overlapping Domain Decomposition Preconditioners for the Generalized Davidson Method for the Eigenvalue Problem," in: Proceed. *Colorado Conference on Iterative Methods*, 1994.
33. A. Stathopoulos and C. F. Fischer, "A Hypercube Implementation of Davidson's Algorithm for the Large, Sparse, Symmetric Eigenvalue Problem", in Proceed. *Intel Supercomputer Users' Group, Annual Conference*, (1991) 343-53.

PROFESSIONAL ACTIVITIES

Software	<p>PRIMME: Preconditioned Iterative MultiMethod Eigensolver. Co-developed with my Ph.D. student James R. McCombs. Multi-year effort leading to one of the foremost state-of-the-art eigenvalue packages. In use by more than 100 science/engineering groups since Oct 2006.</p>
Oct 2006	Broad Release Version 1.1. Includes dynamic method selection.
Apr 2006	Release Version 1.06. Extended functionality for Hermitian matrices.
Oct 2005	Release Version 1
Jun 1995	Developed a Davidson eigenvalue code, which has been used extensively in the atomic physics community, throughout the US and Europe. In addition, it has been used as kernel application for studying I/O performance at Carnegie Mellon University and other research groups.

Conference activities

- 2007 Scientific committee for Conference in Numerical Analysis (NumAn 2007)
- 2007 Minisymposium co-organizer, Intern. Congress Industr. Appl. Math., 2007
- 2006 Steering committee member for High-Performance Computing Symposium 2007
- 2004 Minisymposium co-organizer, 11th SIAM Conf. Parall. Process. Scient. Comput.
- 2001 Program Committee for International Conference on Supercomputing (ICS)
- 2001 Minisymposium co-organizer, 10th SIAM Conf. Parall. Process. Scient. Comput.
- 1997 Minisymposium co-organizer, 8th SIAM Conf. Parall. Process. Scient. Comput.

Invited Talks

- 2008 Householder Symposium XVII, invited research talk, Zeuthen, Germany
“An unrestarted, one-pass Lanczos with on-the-fly updating of eigenvectors”
- 2007 Invited speaker at 4th Intern. Workshop on Numerical Analysis and Lattice QCD, Yale U.
- 2007 Minisymposium invited talk in Intern. Congress Industr. Appl. Math.,
“Enhancements to the PRIMME eigenvalue package and recent experimental results”
- 2007 Department of Mathematics, Southern Methodist University
“State-of-the-art solution of large, sparse, Hermitian eigenvalue problems”
- 2006 Department of Mathematics, McGill University, Canada
“State-of-the-art solution of large, sparse, Hermitian eigenvalue problems”
- 2006 Minisymposium invited talk in Joint GAMM-SIAM Conf. Appl. Lin. Alg
“PRIMME: PReconditioned Iterative MultiMethod Eigensolver, a robust, efficient and flexible Hermitian eigenvalue software”
- 2005 Institute of Technology and Research, University of Crete, Greece
“Runtime support for memory adaptation in scientific applications via local disk and remote memory”
- 2005 Department of Mathematics, University of Athens, Greece
“State-of-the-art solution of large, sparse, Hermitian eigenvalue problems”
- 2005 Workshop on Computational Materials and Molecular Electronics,
Institute for the Theory of Advanced Materials in Information Technology, Austin, TX
- 2005 Householder Symposium XVI, invited research talk, Champion, PA
“Appropriate Use of Jacobi-Davidson Variants for Symmetric Eigenvalue Problems”
- 2004 CSRI, Sandia National Laboratory
“Iterative validation: a scheme for improving reliability and performance for eigensolvers”
- 2004 Stanford University, Scientific Computing/Computational Mathematics (SCCM)
“Designing a nearly optimal symmetric eigensolver under memory constraints”
- 2004 NERSC, Lawrence Berkeley National Lab
“Designing a nearly optimal symmetric eigensolver under memory constraints”
- 2003 Utrecht University, Department of Mathematics, The Netherlands
“Near optimal techniques for large, sparse symmetric eigenproblems”
- 2003 European Research Conference on Advanced Environments and Tools
for High Performance Computing, “Computational challenges in materials sciences”
- 2003 University of Athens, Greece, Dept. of Informatics,
“Application-level resource management in sequential and parallel scientific codes”
- 2003 University of Patras, Greece, Dept. of Mathematics,
“Large, sparse symmetric eigenproblems: is there a method of choice?”
- 2003 University of Patras, Greece, Computer Engineering & Informatics Department
“Application-level resource management in sequential and parallel scientific codes”

2003 Virginia Tech, Dept. of Computer Science,
 “Application level resource management in scientific computing”

2002 Old Dominion University, Dept. of Electrical and Computer Engineering
 “Multigrain parallelism for eigenvalue computations on networks of clusters”

2001 Old Dominion University, Dept. of Computer Science
 “Multigrain parallelism and application-level resource balancing”

2001 University of Ioannina, Greece
 “Improving performance of eigen-methods on parallel, shared resource platforms”

2001 Minisymposium invited talk in 10th SIAM Conf. Paral. Proc. for Sci. Comp.
 “Block Orthogonalization and Block Eigensolvers”

1999 Old Dominion University, Dept. of Computer Science
 “A parallel, block JD implementation on coarse grain environments”

1999 Fifth US National Congress on Computational Mechanics
 “The role of harmonic Ritz vectors in restarting Arnoldi-like methods”

1999 CASC, Lawrence Livermore National Lab
 “A parallel, block JD implementation on coarse grain environments”

1999 NERSC, Lawrence Berkeley National Lab
 “A parallel, block JD implementation on coarse grain environments”
 “The role of harmonic Ritz vectors in restarting Arnoldi-like methods”

1999 University of Illinois at Urbana-Champaign
 “A parallel, block JD implementation on coarse grain environments”

1998 ICASE, NASA Langley Research Center

1998 4th IMACS Intern. Symp. on Iterative Methods in Scientific Computation
 “Restarting techniques for (Jacobi-)Davidson eigenvalue methods”

1997 University of Patras, Greece, Computer Engineering & Informatics Department
 “Parallel methods and software tools for predicting material properties”

1997 Argonne National Lab, Theory Institute
 ‘Restarting techniques for preconditioned symmetric eigenvalue methods”

1996 The Boeing Company, Commercial Airplane Division
 “Restarting techniques for preconditioned eigenvalue methods”

1996 Institute for Mathematics and its Applications, MN
 “Parallel implementation of the Davidson method with applications”

1995 University of Tennessee at Knoxville, Computer Science Department
 “Preconditioned iterative methods for large eigenproblems on multicomputers”

Reviewer

NSF CRCRD, ACR, CCF, CreativeIT, and several NSF ITR Proposal Review Panels
 SIAM J. on Scientific Computing, SIAM J. on Matrix Analysis and Applications
 SIAM books, ACM Transactions on Mathematical Software, ETNA
 Mathematics of computation, Applied Numerical Mathematics
 Numerical Linear Algebra with Applications, Linear Algebra and its Applications
 Computer Physics Communications, J. Computational and Graphical Statistics
 Journal of Computational Statistics and Data Analysis
 Journal of Computational Physics, Parallel Computing
 ICCP’04, ICS’03, ICS’01, IPPS’97, ICS’96, Irregular’96

Societies

Member of SIAM, IEEE, and IEEE Computer Society

STUDENTS GRADUATED

- 2007 J. R. McCombs, (Ph.D.) "Toward a robust and efficient iterative eigensolver"
**Awarded the "W&M Distinguished Dissertation Award in the
Natural and Computational Sciences"**
- 2007 A. Schwartz, (M.S.) "Optimizing Sparse Matrix-Multivector Multiplications
for Multi-Core Architectures"
- 2004 R. T. Mills, (Ph.D.) "Dynamic adaptation to CPU and memory load in
scientific applications"
- 2002 E. Wiebel, (M.S.) "Collective operations in the UPC programming model"
- 2001 R. T. Mills, (M.S.) "Application-level dynamic balancing of CPU and memory
load on a coarse-grain parallel iterative eigensolver"
- 2000 M. Staron, (M.S.) "An optimized, portable OpenMP Implementation of BLAS"
- 1999 J. R. McCombs, (M.S.) "A parallel, block, Jacobi-Davidson method for
computing the extreme eigenpairs of large, sparse, symmetric matrices"

COURSES TAUGHT

Graduate

CS 749. Numerical Algorithms, Spring 2000, Spring 2003, Spring 2006
CS 780, Topics in Eigenvalue methods, Spring 2001
CS 674 (CS 649) Parallel Computing, Fall 2002, 04, 06, 07 (Fall 1998, 00)
CS 654, Advanced Computer Architecture, Spring 2002, 2007
CS 653, Analysis of Algorithms, Fall 1997, Fall 1999, Fall 2005
CS 690/790, Individual studies, Fall 1997, 1999, Spring 2000

Undergraduate

CSUMS, Fall/Spring 2007-12: An undergraduate, NSF funded, interdisciplinary
program between Mathematics and Computer Science with weekly seminars,
lectures, and research projects.

CS 420, Modeling, Simulation and Analysis Research Seminar, Spring 2002
An undergraduate, NSF funded, interdisciplinary course, with participants from the
departments of Mathematics, Physics, Computer Science, and a Physics professor
from Hampton University.

CS 424, Computer Architecture, Spring 2003, Fall 2004
CS 303, Algorithms, Spring 1999
CS 141, Introduction to Computer Science, Spring 1998, 2001, Fall 1998-99, 2001

SERVICE TO THE COLLEGE

Departmental committees and activities

- 2007-08 Chair of Personnel Committee
- 2006-08 Graduate Admissions Committee
- 2004-08 Personnel Committee, Faculty Recruiting Committee
- 2005-06 Chair of Faculty Recruiting committee, Personnel Committee
- 2005-06 Department's Computing Environment Committee
- 2005-06 Graduate Curriculum Committee
- 2005 Drafted the Department's accreditation document for the B.S. program
- 2004-05 Chair, Graduate Curriculum Committee
- 2002-03 Chair, Computing Systems Committee
- 2002-03 Graduate Curriculum Committee

2002-03 Personnel Committee
1999-03 Graduate Admissions Committee
1999-02 Faculty Hiring Committee
1997-02 Curriculum Committee
1997-99 Developed a graduate numerical algorithms course on iterative methods,
and co-developed a Parallel Computing graduate course
1997-01 Academic adviser for five CS undergraduate concentrators

College-wide activities

2007 Member of Ad Hoc High Performance Computing Advisory Committee
2004-07 Academic adviser for Orthodox Christian Fellowship student association
1997-07 Active member of the Computational Science Cluster (CSC)
Actively participated in campus-wide CSC and HPC advisory meetings and seminars.
Pursued collaboration opportunities with faculty in Physics and VIMS.
1999 One of seven College-wide PIs in the NSF MRI grant that started the SciClone project,
a cluster of workstations serving the high performance computing needs of the College.
1997-98 Computational Science Cluster Curriculum Committee
Frequent meetings with the director, R. Voigt, three CS faculty, and in coordination
with faculty in Applied Science and Physics, that led to the development of the
requirements for M.S. and Ph.D. degrees with specialization in Computational Sciences,
and the design of four new CS courses that played a central role in the CSC.

Student committees

2007 Committee Sean Krems (M.S.)
2006 Committee Glenn Hines (Ph.D.)
2005 Committee R. J. Walter (M.S.), W. Purwanto (Ph.D. in Physics)
2004 Committee S. Jiang, K. Barker (M.S.), S. Mains (Ph.D.)
2003 Committee Z. Zhu (Ph.D.)
2002 Committee Z. Zhang, R. Jones (Ph.D.)
2001 Committee for T. Litant (Ph.D.)
2000 Committee for A. Miner (Ph.D.)
2000 Committee for M. Weber, A. Mangalam and C. Tucker (M.S.)
1999 Committee for T. Rinoski and J. Moriarti (M.S.), B. Lawson (Ph.D. proposal)
1999 Honors committee for T.J. Walls (Applied Sciences)
1998 Committee for V. Sandor (Ph.D.)
1998 Committee for K. Roe (M.S.)